

**TIDEWATER COMMUNITY COLLEGE**  
**VIRGINIA BEACH CAMPUS**  
**DIVISION OF NATURAL SCIENCES AND MATHEMATICS**  
**COURSE PLAN**  
**FOR**  
**MTH 285-LINEAR ALGEBRA**

**Lecture Hours 3      Lab Hours 0      Credit Hours 3**

**In Effect Beginning      Summer 2009**

**And Continuing Through      \_\_\_\_\_**

**I. Course Description:**

Covers matrices, vector spaces, determinants, solutions of linear systems of equations, basis and dimension, and eigenvalues and eigenvectors. Designed for mathematical, physical and engineering science programs.

**II. Corequisite:**

MTH 174 or equivalent.

**III. Introduction:**

This course is an introduction to linear algebra.

**IV. References:**

Given as necessary.

**V. Course Objectives:**

The student must master the following concepts:

**A. Systems of linear equations (Ch 1)**

- 1.1 Introduction to systems of linear equations
- 1.2 Gaussian elimination and Gauss-Jordan elimination

**B. Matrices (Ch 2)**

- 2.1 Operations with matrices
- 2.2 Properties of matrix operations
- 2.3 The inverse of a matrix
- 2.4\* Elementary matrices

**C. Determinants (Ch 3)**

- 3.1 The determinant of a matrix
- 3.2 Evaluation of a determinant using elementary operations
- 3.3 Properties of determinants

**D. Vector spaces (Ch 4)**

- 4.1 Vectors in  $\mathbb{R}^n$
- 4.2\* Vector spaces
- 4.3 Subspaces of vector spaces
- 4.4 Spanning sets and linear independence
- 4.5 Basis and dimension
- 4.6 Rank of a matrix and systems of linear equations
- 4.7\* Coordinates and change of basis

**E. Inner product spaces (Ch 5)**

- 5.1 Length and dot product in  $\mathbb{R}^n$
- 5.2\* Inner product spaces
- 5.3 Orthonormal bases: Gram-Schmidt process

**F. Linear transformations (Ch 6)**

- 6.1 Introduction to linear transformations
- 6.2 The kernel and range of a linear transformation
- 6.3 Matrices for linear transformations
- 6.4\* Transition matrices and similarity

**G. Eigenvalues and eigenvectors (Ch 7)**

- 7.1 Eigenvalues and eigenvectors

\* Sections marked with an asterisk may not be included by all instructors.

**VI. Suggested weekly outline for Fall and Spring semesters:**

Week 1:	1.1,	1.2
Week 2:	2.1,	2.2
Week 3:	2.3,	2.4*
Week 4:	3.1,	3.2
Week 5:	3.3	
Week 6:	4.1,	4.2*
Week 7:	4.3,	4.4
Week 8:	4.5,	4.6
Week 9:	4.7*,	5.1
Week 10:	5.2*,	5.3
Week 11:	6.1	
Week 12:	6.2	
Week 13:	6.3	
Week 14:	6.4*	
Week 15:	7.1	

**VII. Suggested weekly outline for Summer semester:**

Week 1:	1.1,	1.2,	2.1
Week 2:	2.2,	2.3,	2.4*
Week 3:	3.1,	3.2,	3.3
Week 4:	4.1,	4.2*	
Week 5:	4.3,	4.4,	4.5
Week 6:	4.6,	4.7*,	5.1
Week 7:	5.2*,	5.3	
Week 8:	6.1,	6.2	
Week 9:	6.3,	6.4*	
Week 10:	7.1		

\* Sections marked with an asterisk may not be included by all instructors.